J. Univ. Med. Dent. Coll., Vol.13(2), 372-376;2022
ISSN (Print) 2221-7827, ISSN (Online) 2310-5542
DOI: 10.37723/jumdc.v13i2.625
http://www.jumdc.com/

Original Article

Open Access

Management of Fournier's Gangrene at postgraduate medical institute Sandeman Provincial Hospital Quetta

Anwar Lehri [a], Muhammad Iqbal Khan [b], Riffat Arbab [c], Lailama Shah [c], Shabir Ahmed Lehri [d], Hafsa Jaffar [e]

[a]Senior Medical Officer/ Post-Graduate Resident Post-Graduate Medical Institute, Sandman Provincial Hospital Quetta.
[b]Assistant Professor, Department of Surgery/ Deputy Registrar (Admin) Post-graduate Medical Institute Quetta.
[c]Assistant Professor, Department of Surgery Bolan Medical College Quetta.
[d]Professor, Department of Neurosurgery Dean/Director Post-graduate Medical Institute Quetta.
[e]Post-graduate Resident, Department of Gynaecology & Obstetric Post-graduate Medical Institute, Sandman Provincial Hospital Quetta.

*Corresponding author: miqbaljaffar@gmail.com

ABSTRACT

BACKGROUND & OBJECTIVE: Fournier's Gangrene is a quick development of necrotizing, fulminant infection of the scrotum, perineum, and lower abdominal wall and can involve the groin. Synergic aerobic and anaerobic organisms can cause this disease. The aim of this study is to evaluate the causes, complications and optimal treatment of Fournier's Gangrene.

METHODOLOGY: A total of 150 patients were included. Fournier's Gangrene was diagnosed clinically. Detailed clinical examination was performed, and the complications and modes of treatment were recorded. Calculation of descriptive statistics was done by the stratification and application of independent T-test and Chi-square test wherever applicable for post-stratification, considering p-value ≤0.05 as significant.

RESULTS: The mean age was 31.74±6.24 years. The most common presenting complaint was the dusky appearance of the overlying skin. In the diabetic group, (66)44% had intense genital pain and tenderness, while in the non-diabetic group (72)48% observed a dusky appearance of the overlying skin and (37)24.7% had morbid obesity. No significant association was found between mortality of study groups, their age groups and their duration of hospital stay.

CONCLUSION: Most common presenting complaint was the dusky appearance of the overlying skin. The anal abscess was the most common etiology, followed by a strangulated inguinal hernia. The mortality rate was 24%.

KEYWORDS: Fournier's Gangrene, Causes, Complications, Mode of.

INTRODUCTION

In 1764 Baurienne explained Fournier's gangrene (FG) and then named after Jean Alfred Fournier as Fournier's gangrene (FG) [1]. Fournier's Gangrene has predominantly been seen in males. Recent studies have shown that Fournier's Gangrene primarily affects people between the age group of 30 to 60 and the specific person in a state of having multiple health issues, and there is always a factor behind the cause of this disease [2].

This disease is usually caused by infections related to anorectal, genitourinary, perineal, and genital skin injuries. Synergistic necrotizing fasciitis with thrombosis of small subcutaneous arteries, a suppurative bacterial infection in the anorectal, perineal or genitourinary areas, and skin gangrene are the pathologies of Fournier's Gangrene [3]. The local infection quickly spreads to deep fascial layers, causing obliterative endarteritis, cutaneous and subcutaneous vascular thrombosis, and tissue necrosis due to the inflammatory reaction. Fascial necrosis can advance at a rate of 2-3 cm/ hour, and it is essential to diagnose early. Studies have shown that there is some recognizable cause of Fournier Gangrene, and in most cases that appears slowly [4]. For Fournier's Gangrene, many terms were used in several years, like streptococcus gangrene, necrotizing fasciitis, periurethral phlegmon, phagedenic and synergistic necrotizing cellulitis.

In the treatment of Fournier's Gangrene, early surgical debridement of necrotic tissues and antibiotics are essential. Mortality remains still high and averages 20–30% despite aggressive management [5,6].

Lehri A, Khan MI, Arbab R, Shah L, Lehri SA, Jaffar H. Management of Fournier's Gangrene at postgraduate medical institute Sandeman provincial Hospital Quetta. Journal of University Medical & Dental College. 2022; 13(2):372-376.

It is a dreadful bacterial infection that can lead to crucial micro vascular thrombosis and hence extensive tissue necrosis. Due to sever sepsis, repeated surgeries for debridement and reconstruction patient may have repeated admissions which has terrible impact on patient's psychology and social status. Fournier's Gangrene has high morbidity and mortality rate as much as 40% in some reports[7]. Quick surgical removal of all necrotic tissue along with achievement of healthy margins, use of broad-spectrum antibiotics and hemodynamic stability is essential to control the disease. During a single admission multiple surgeries, potential divergence of urinary or gastrointestinal tracts may be needed. Based on repeated examinations and multiple laboratory tests necessary debridement and admission are planned. This is helpful to reduce the extend of Gangrene [8]. Disease is diagnosed based on symptoms and physical checkups. If there is crepitus, radiological methods can help to represent the presence of gas, but it may be of no use. In most cases anemia, leukocytosis, thrombocytopenia, hyperglycemia, hyponatremia, hypokalemia, azotemia, and hypoalbuminemia can be seen. If we use the traditional methods, six days are required to diagnose a disease, and for the verification of necrotizing fasciitis through biopsy, additional time will be needed [9].

Fournier's Gangrene Severity Index (FGSI) is considered an authentic forecasting tool and has become a standard for researchers [10,11]. Early diagnosis, immediate resuscitation, administration of broad-spectrum antibiotics and quick radical surgical removal of affected tissues from the organ are necessary [12].

In this study, the main goal of the research is to study the FGs patients and manage them well, identifying the risk factors and their impact on mortality.

METHODOLOGY

This Descriptive cross-sectional study was conducted at the Department of Urology, Postgraduate Medical Institute, Sandman Provincial Hospital, Quetta. The study was conducted after receiving ethical approval letter bearing no. PGMI-25/6. The study was conducted from February 2020 to July 2020. Sample of 150 patients was included in the study. Sample was taken by non-probability consecutive sampling. In Inclusion Criteria those patients who are above ten years and below 75 years and only male patients were included in the study. All those patients who had debilitating diseases and conditions, such as malnourished, immune compromised patients and burn cases, were excluded from the study.

Cases of Fournier's Gangrene were diagnosed clinically that were meeting the inclusion and exclusion criteria. Cases were collected from the emergency department, outpatient department, and in-hospital referrals. These data were put on proforma. After taking informed consent, patients were admitted in the ward, detailed and thorough clinical examinations were performed and the complications and mode of treatment were recorded on a specially designed proforma.

Data analysis was done using the computer package "SPSS version 23". Frequency and percentage were computed to present all the categorical variables, including sex, presenting complain, surgical procedures, and early complications. Age, presenting time, and hospital stay were presented by Mean±SD. Independent t-test, Chi-square test was applied for post-stratification considering p-value ≤0.05 as significant.

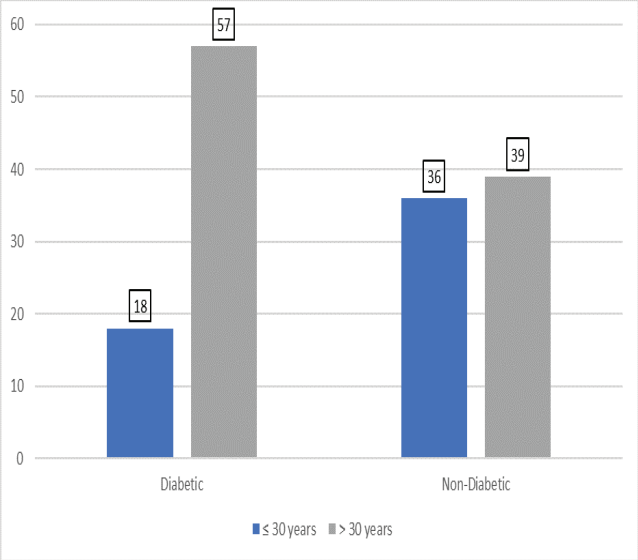
RESULTS

A sample of 150 male patients of FG were taken. The mean age was 31.74±6.24 years, while the mean age in the diabetic and non-diabetic group was 34.01±4.64 years and 29.46±6.81 years, respectively. The age was further divided into two groups. Figure-I shows the ratio of patients in these groups. Comparison of general characteristics, blood and serum parameter of the study population shown in Table-I. Figure-II shows the ratio of patients in these groups. The detailed frequency distributions of religion, socio-economic status, and residence address are shown in Table-II. Out of 150 patients, 52% were referred by general physicians, while in the diabetic group, 48% were referred to visit by self, a general physician referred 70.7% of patients in the diabetic group. The majority of patients (89.3%) were admitted through OPD, while the most common presenting complaint was the dusky appearance of the overlying skin. In the diabetic group, 44% were found with intense genital pain and tenderness, while in the non-diabetic group, 48% were found with a dusky appearance of the overlying skin.

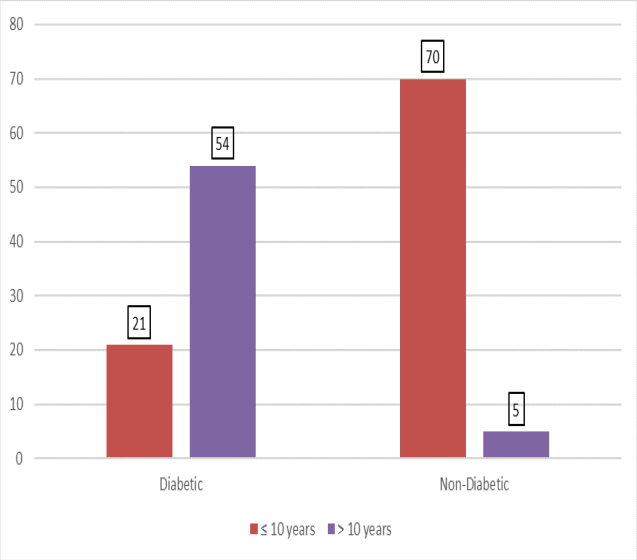
In this research, an overall mortality rate of 24% was found, while the mortality rate in diabetic and non-diabetic groups was 28% and 20%, respectively. Significant association were founded between socio economic status (p-value 0.035), admission department (p-value 0.000), probable cause (p-value 0.028), Fournier gangrene etiology (p-value 0.001) and mortality (p-value 0.001). However an insignificant association of mortality was found with the study group as shown in (table-III). Stratification was also done for stratified categories of age group and hospital stay duration. Detailed results of stratified categories presented are shown in table-III. No significant association was found between mortality of study groups, their age groups and their duration of hospital stay.

DISCUSSION

Fourniers Gangrene (FG), also called necrotizing fascitis is caused by synergistic aerobic and anaerobic organisms in which infection spreads along the fascial planes of the scrotum and perineum leading to soft-tissue necrosis. First, it was reported by Baurienne in 1874. However, later in 1883, French dermatologist Jean Alfred Fournier reported a syndrome of rapidly growing Gangrene in the penis and scrotum of five healthy young men with no other obvious pathology [13, 14]. In his early research, he has explained this disease as an idiopathic entity. However, later, further studies revealed that the infection originates from the



Figure–I: Patient's Ratio based on age (n=150).



Figure–II: Ratio of patients according to hospital stay duration groups (N=150).

Table-I: Comparison of general characteristics, blood and serum parameter of the study population.

Characteristics	Diabetic (n=75) Mean±SD	Non-Diabetic (n=75) Mean±SD	Overall (n=150) Mean±SD	p-value
Age	34.01±4.64	29.46±6.81	31.7± 6.24	<0.001
Pulse rate (beats/min)	77.65±1.39	77.73±1.57	77.69±1.48	<0.001
Systolic blood pressure (mmHg)	106.76±10.12	105.25±10.53	106.00± 10.32	0.180
Diastolic blood pressure (mmhg)	69.38±5.17	68.25±4.98	68.82±5.09	0.510
Temperature (0f)	99.66±1.51	99.62±1.42	99.64±1.46	0.078
Hemoglobin (g/dl)	11.83±1.42	12.52±1.54	12.17±1.52	0.021
Lymphocyte count (/cm)	7.47±1.71	7.45±1.69	7.49±1.74	0.011
Blood urea	7.81±1.58	8.47±1.73	8.14±1.68	<0.001
Blood serum creatinine	0.90±0.19	0.79±0.17	0.84±0.19	<0.001
Fasting blood sugar (mg/dl)	132.84±5.68	93.72±14.82	113.28±22.59	<0.001
Hospital stay (days)	10.81±4.36	7.80±1.61	13.82±4.16	0.220

**** Mean Highly significant**

perianal, urinary tract, and local skin infection or trauma in most cases. In Fourniers Gangrene, the average age of patients reported was 47.5 years, from 40.9 to 61.7 years, consistent with my study. In a large population-based study, Sorensen et al. observed that the growing age is the most vital risk factor of mortality (OR 4.0 to 15.0, p <0.001) [15]. In comparison, it is observed that the survivors were younger than the non-survivors. In the present study mortality rate was observed high in the patient having more than 30 years. Despite improvement in medical care and treatment, the mortality rate for FG is still high, i.e., 20-50%. Risk factors like increasing age, primary anorectal infections, presence of diabetes, lag in treatment, systemic sepsis, extent and progression of the disease, a low hematocrit, a high leukocytosis, high blood urea nitrogen, a high alkaline phosphatase, serum albumin, have a significant impact on mortality. The risk factors used to predict outcomes always remain controversial. The universally accepted system FGSI was developed to guide the physicians to predict the outcome [16,17]. There are many factors considered to accurately predict the fate of FG that are mainly related to the immune system.

Along with this pathology, a co-morbid disease like Diabetes mellitus (DM) was mainly observed. Some researchers observed that 50 to 70% of patients who developed FG had DM. In the present study, the mortality rate among diabetes mellitus as a co-morbidity was found more than non-diabetic patients [18]. Studies did not consider as a forecaster of morality. Effect of location and spread of necrotizing infection was also observed in the present study that infection started from the perianal region and spread to the scrotal and inguinal area had more morbidity and mortality than infection started scrotum after minor trauma. It is reported that the location spread of necrosis in Fournier's Gangrene affected the outcome of treatment [19].

It is revealed that necrosis started in the perianal region in nine patients and spread to the inguinal, gluteal, and scrotum was associated with high mortality. In this study, it was observed that the patients who had compromised renal

Table-II: Demographic characteristics of the study population.

Demographic characteristics		Diabetic n=75	Non-Diabetic n=75	Overall n=150	p-value
	Muslim	67(89.3)	72(96)	139(92.7)	
Religion	Hindu	4(5.3)	1(1.3)	5(3.3)	
	Christian	4(5.3)	2(2.7)	6(4)	0.547
	Low	56(74.7)	27(36)	83(55.3)	
Socio Economic Status	Middle	18(24)	37(49.3)	55(36.7)	<0.001
	High	1(1.3)	11(14.7)	12(8)	
Residence Address	Urban	27(36)	34(45.3)	61(40.7)	0.161
	Rural	48(64)	41(54.7)	89(59.3)	
Referral	General Physician	25(33.3)	53(70.7)	78(52)	
	Self	36(48)	22(29.3)	58(38.7)	0.711
	Others	8(5.33)	6(4)	14(9.3)	
Admission Department	Emergency	70(93.3)	64(85.3)	16(10.7)	<0.001
	OPD	5(6.7)	11(14.7)	134(89.3)	
Probable Cause	Compromised Immune system	31(41.3)	28(37.3)	59(39.3)	
	History of Alcohol Abuse	28(37.3)	26(34.7)	54(36)	<0.001
	Morbid obesity	16(21.3)	21(28)	37(24.7)	
Urine Detail Report	Bacteria seen	42(56)	50(66.7)	92(61.3)	
	Bacteria not seen	33(44)	25(33.3)	58(38.7)	0.110
	Anal abscess	42(56)	44(58.7)	86(57.3)	
Fournier Gangrene Etiology	Strangulate d Inguinal Hernia	18(24)	16(21.3)	34(22.7)	<0.001
	Thrombosed Emorrhoid	15(20)	15(20)	30(20)	
Mortality	Yes	21(28)	15(20)	36(24)	<0.001
	No	54(72)	60(80)	114(76)	

** Highly significant

Table–III: Association between mortality, age, hospital stay duration and study groups(n=150).

		Group		Total	p-value
		Diabetic	Non-Diabetic		
Mortality	Yes	21(58.3)	15(41.7)	36	0.251
	No	54(47.4)	60(52.6)	114	
≤30 years	Yes	5(29.4)	12(70.6)	17	0.679
	No	13(35.1)	24(64.9)	37	
>30 years	Yes	16(84.2)	3(15.8)	19	0.0181
	No	41(53.2)	36(46.8)	77	
≤10 days	Yes	4(21.1)	15(78.9)	19	1.00
	No	17(23.6)	55(76.4)	72	
>10 days	Yes	17(100)	0(0)	17	0.3081
	No	37(88.1)	5(11.9)	42	

function on admission had high mortality than those with normal renal function. This study identified that poor renal function is a strong predictor of mortality in patients with FG. We needed to involve the nephrologist in many cases. Also we observed that spread of disease from one anatomical region to another region is highly associated with increased mortality. The same high mortality was observed in a study by Okwudili. However, other studies had no such relation between the extension of the Gangrene and poorer prognosis [20]. Fourniers Gangrene is an acute and fulminant disease that needs urgent diagnosis and surgical management. A timely management of risk factors related to adverse outcome and involvement of multiple disciplines to manage its systemic effects can help to improve the adverse outcome.

CONCLUSION

The present study concluded that Fourniers Gangrene is an acute surgical emergency requiring urgent diagnosis and prompt surgical intervention. It needs the removal of necrotic tissue and needs a multidisciplinary approach to decrease mortality and morbidity.

ACKNOWLEDGEMENT: None.
CONFLICT OF INTEREST: None.
GRANT SUPPORT & FINANCIAL DISCLOSURE: None.

REFERENCES:

1. Taken K, Oncu MR, Ergun M, Eryilmaz R, Demir CY, Demir M, et al. Fournier's Gangrene: Causes, presentation and survival of sixty-five patients. Pakistan Journal of Medical Sciences. 2016;32(3):746-750. Doi: 10.12669/pjms.323.9798.
2. Hagedorn JC, Wessells H. A contemporary update on Fournier's Gangrene. Nature Reviews Urology. 2017;14(4):205-214. Doi:10.1038/nrurol.2016.243
3. Wongwaisayawan S, Krishna S, Haroon M, Nisha Y, Sheikh A. Fournier gangrene: pictorial review. Abdominal Radiology.2020;45(11):3838-3848. Doi:10.1007/s00261-020-02549-9
4. Pehlivanlı F, Aydin O. Factors affecting mortality in Fournier gangrene: a single center experience. Surgical infections. 2019;20(1):78-82. Doi:10.1089/sur.2018.208.
5. Bermani BF, Rizaliyana S, Handriani I. Predisposition Factors Analysis for Fournier's Gangrene Defects Closure Complication. Jurnal Rekonstruksi dan Estetik. 2020;6(1):13-17. Doi: 10.9734/jammr/2020/v32i2330723
6. Auerbach J, Bornstein K, Ramzy M, Cabrera J, Montrief T, Long B. Fournier Gangrene in the Emergency Department: Diagnostic Dilemmas, Treatments and Current Perspectives. Open Access Emergency Medicine: OAEM. 2020; 12:353-364. Doi: 10.2147/OAEM.S238699
7. Rodler S, Weig T, Finkenzeller C, Stief C, Staehler M. Fournier´ s Gangrene Under Sodium-Glucose Cotransporter 2 Inhibitor Therapy as a Life-Threatening Adverse Event: A Case Report and Review of the Literature. Cureus. 2019;11(9).
8. Singh A, Ahmed K, Aydin A, Khan MS, Dasgupta P. Fournier's Gangrene. A clinical review. Archivio Italiano di Urologia e Andrologia. 2016;88(3):157-164. Doi:10.4081/aiua.2016.3.157
9. Ozkan OF, Koksal N, Altinli E, Celik A, Uzun MA, Cıkman O, et al. Fournier's gangrene current approaches. International Wound Journal.2016;13(5):713-716. Doi:10.1111/iwj.12357
10. Chernyadyev SA, Ufimtseva MA, Vishnevskaya IF, Bochkarev YM, Ushakov AA, Beresneva TA, et al. Fournier's Gangrene: literature review and clinical cases. Urologia Internationalis. 2018; 101:91-97. Doi:10.1159/000490108
11. Oguz A, Gümüş M, Turkoglu A, Bozdağ Z, Ülger BV, Agaçayak E, et al. Fournier's gangrene: a summary of 10 years of clinical experience. International Surgery. 2015;100(5):934-941. Doi:10.9738/INTSURG-D-15-00036.1
12. Ye J, Xie T, Wu M, Ni P, Lu S. Negative pressure wound therapy applied before and after split-thickness skin graft helps healing of Fournier gangrene: a case report (CARE-Compliant). Medicine. 2015;94(5). Doi: 10.1097/MD.0000000000000426
13. Palmer LS, Winter HI, Tolia BM, Reid RE, Laor E. The limited impact of involved surface area and surgical debridement on survival in Fournier's Gangrene. British Journal of Urology. 1995;76(2):208-212. Doi:10.1111/j.1464-410X.1995.tb07676.x.
14. Pastore AL, Palleschi G, Ripoli A, Silvestri L, Leto A, Autieri D, et al. A multistep approach to manage Fournier's Gangrene in a patient with unknown type II diabetes: surgery, hyperbaric oxygen, and vacuum-assisted closure therapy: a case report. Journal of Medical Case Reports. 2013;7(1):1-5.
15. Verma S, Sayana A, Kala S, Rai S. Evaluation of the utility of the Fournier's gangrene severity index in the management of Fournier's Gangrene in North India: A multicentre retrospective study. Journal of Cutaneous and Aesthetic Surgery. 2012;5(4):273-276. Doi: 10.4103/0974-2077.104916
16. Gangrene foudroyante de la verge (overwhelming Gangrene). Sem Med 1883. Diseases of the Colon and Rectum. 1988;31(12):984-988. Doi: 10.1007/BF02554904.
17. Sorensen MD, Krieger JN, Rivara FP, Klein MB, Wessells H. Fournier's Gangrene: management and mortality predictors in a population based study. The Journal of Urology. 2009;182(6):2742-2747.
18. Roghmann F, Von Bodman C, Löppenberg B, Hinkel A, Palisaar J, Noldus J. Is there a need for the Fournier's gangrene severity index? Comparison of scoring systems for outcome prediction in patients with Fournier's Gangrene. BJU International. 2012;110(9):1359-1365. Doi:10.1111/j.1464-410X.2012.11082.x
19. Wolach MD, MacDermott JP, Stone AR, White RD. Treatment and complications of Fournier's Gangrene. British Journal of Urology. 1989;64(3):310-314. Doi:10.1111/j.1464-410X.1989.tb06020.x
20. Okwudili OA. Temporary Relocation of the Testes in Anteromedial Thigh Pouches Facilitates Delayed Primary Scrotal Wound Closure in Fournier Gangrene with Extensive Loss of Scrotal Skin Experience With 12 Cases. Annals of Plastic Surgery. 2016;76(3):323-326.

Author's Contribution:
Anwar Lehri: Data collection and literature research.
Muhammad Iqbal Khan: Statistical analysis.
Riffat Arbab: Manuscript writing and data collection.
Lailama Shah: Data collection and statistics.
Shabir Ahmed Lehri: Overall supervision.

Submitted for publication: 13-05-2021
Accepted after revision: 21-04-2022